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INVENTION OF THE QUADRANT,

By T. Godfrey.

Although the honor of inventing the quadrant, has by its bearing his name, been conferred upon Mr. Hadley, yet it is well known to many, that the real inventor of it was Thomas Godfrey, a native of Philadelphia. The following letters and statements, extracted from the American Magazine, for July and August 1758, and published from the originals, will exhibit the rise and progress of the invention, and prove satisfactorily, we think, that the honour of it attaches to Mr. Godfrey, and through him to this state and city.

On the Invention of the Quadrant commonly called HADLEY'S.

The great improvement which the art of navigation has received from the invention of this instrument, must ever place those concerned in it, among the highest class of names that will be remembered by posterity. Though *Mr. Hadley*, (whose fame in the learned world can suffer no diminution by what we are now to publish) has great merit in the improvement of this instrument which bears his name, yet there is sufficient reason to conclude that he was not the first inventor.

In the philosophical transactions, No. 435, there is an "Account of *Mr. Thomas Godfrey's* improvement of *Davis's* Quadrant transferred to the Mariner's Bow, by the late *Mr. Logan* of this place, whose reputation in mathematics was inferior to few in his day. In that account it appears that *Mr. Godfrey*, of this city, had begun to think of this matter as early as the year 1730. He was a glazier by trade, and a man of no education, but perhaps the most singular phenomenon that ever appeared in the learned world, for a kind of natural or intuitive knowledge of the abstrusest parts of mathematics and astronomy.

In order, therefore, to show how far the honor of this invention is due to *Mr. Godfrey* and his patron Mr. Logan, we propose to publish Mr. Logan's original account referred to in the above quoted number of the philosophical transactions; together with two letters to the royal society written previous to that account, one by *Mr. Logan* and the other by *Mr. Godfrey* himself. These three letters will give a complete view of the whole affair in its rise and progress. They were put into our hands by a sensible and candid citizen of Philadelphia, with the following pertinent introduction, and, therefore, their authenticity, if it were doubted, may be easily vouched.

To the Proprietor's, &c.

Gentlemen,—All civilized states have thought it their honour to have men of great ingenuity born or bred among them. Many cities of ancient *Greece* had long and sharp contentions for the honour of *Homer's* birthplace. And in later times volumes have been written in *Europe*, in disputing which city had the true claim to the invention of the art of printing. Nor is it to be wondered that mankind should be so generally eager in this respect, since nothing redounds more to the honour of any state than to have it said that some science of general utility to mankind was invented or improved by them. Nevertheless it often happens that the true author of many an useful invention, either by accident or fraud, loses the credit thereof, and from age to age, it passes in the name of another. Thus it happened, heretofore, to *Columbus* and many others; and thus also it has happened to a native of *Philadelphia*.

Mr. *Thomas Godfrey*, it is well known to many of us here, was the real inventor of that very useful instrument called *Hadley's* Quadrant or Octant. To him the merit is due, and to his posterity the profit ought to belong.—This will fully appear from the three following genuine letters, which I persuade myself, you will think worthy of being recorded in your Magazine, in order to restore, as far as possible, the credit of that invention to our city, and to the posterity of Mr. *Godfrey*. How he came to be deprived of it may be made a question by some. I answer that Mr. *Godfrey* sent the instrument to be tried at sea by an acquaintance of his, an ingenious navigator, in a voyage to *Jamaica*, who showed it to a captain of a ship there just going for *England*, by which means it came to the knowledge of Mr. *Hadley*, though, perhaps, without his being told the name of the real inventor. This fact is sufficiently known to many seamen and others yet alive in this city; and established beyond doubt by the following letters, written about that time. It is, therefore, submitted to the world, whether, after perusing the letters, they ought not, in justice, to call that instrument, for the future, *Godfrey's*, and not *Hadley's* Quadrant.

To Dr. Edmund Halley.

Esteemed Friend,—The discovery of the Longitude having, of late years, employed the thoughts of many, and the world now expecting [illegible] great sagacity and industry, some advances [illegible] far exceeding all former attempts, from the [illegible] moon, to the ascertaining of which thy labou[illegible] long and happily been directed; the follow[illegible]e, I hope, will neither be thought unseasonable, [illegible]rove unacceptable. That the success of that met[illegible] depends on finding the Moon's true place for one meridian by calculation, and for another by observation, I think is generally allowed; the first of which being depended on from thy great genius, what remains is some certain method for observation, practicable on that unstable element, the sea. In order to this, thy predecessor at *Greenwich*, if I mistake not, for some years, published his calculations for the moon's future appulse to the fixed stars, which would save all observation, but that of a glass; but these not often happening, and the moon often having a considerable parallax when they did, that project dropt.

For finding her place by taking her greater distances from stars, the fore-staff or cross-staff cannot be exact enough: and Quadrants, Sextants, &c. with two Telescopes, are impracticable at sea.

Dr. Biester's late proposal for taking the difference of rad. ascension between the moon and a star, if that should prove practicable with sufficient exactness, would undoubtedly answer the intention of all that is to be expected from the moon, if her place were taken on or near the meridian. But to keep the arch of this instrument in the plane of the equator, and, at the same time, view two objects of unequal altitudes, and considerable distance from each other, by the edges of two sights,

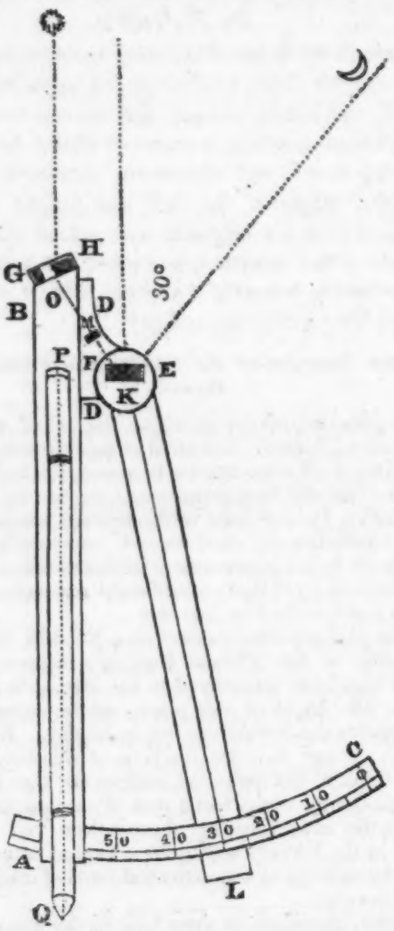
with the necessary accuracy, will not, perhaps, be so easy in practice as he would have it believed.

I shall, therefore, here presume, from thy favour shown me in England, in 1724, to communicate an invention that, whether it answer the end or not, will be allowed, I believe, to deserve thy regard. I have it thus:

A young man, born in this country, *Thomas Godfrey* by name, by trade a glazier, who had no other education than to learn to read and write, with a little common arithmetic, having, in his apprenticeship with a very poor man of that trade, accidentally met with a mathematical book, took such a fancy to the study, that, by the natural strength of his genius, without any instructor, he soon made himself master of that, and of every other of the kind he could borrow or procure in *English;* and finding there was more to be had in *Latin* books, under all imaginable discouragements, applied himself to the study of that language, till he could pretty well understand an author on these subjects; after which, the first time I ever saw or heard of him, to my knowledge, he came to borrow Sir *Isaac Newton's Principia* of me. Inquiring of him hereupon who he was, I was indeed astonished at his request; but after a little discourse, he soon became welcome to that or any other book I had. This young man, about 18 months since, told me he had for some time been thinking of an instrument for taking the distances of stars by reflecting speculums, which he believed might be of service at sea; and not long after he showed me a common sea Quadrant, to which he had fitted two pieces of looking-glass in such a manner as brought two stars, at almost any distance, to coincide; the one by a direct, the other by a reflected ray, so that the eye could take them both together as joined in one, while a moving label or index on the graduated arch marked exactly half their distance: for I need not say that the variations of the angles of reflection from two speculums are double to the angle of the inclination of their planes, and therefore gives but half the angle or arch of the distance, which is the only inconveniency that appears to me to attend this. But as it may be made so simple, easy and light, as not to be much more unwieldy or unmanageable, though of a considerable length, than a single telescope of the same, that inconveniency will be abundantly compensated.

The descrip[illegible]t, as he proposes it, and has got one made, i[illegible] which he is willing I should communicate [illegible] possibly it may be of service.

To a straigh[illegible] piece of wood, A B, of about three inches in [illegible], and from 40 to 45 in length (or of any other t[illegible]y be thought convenient), with a suitable thickn[illegible]n arch or limb, A C, of about 30 degrees to the rad[illegible], K L, is to be fixed. To the upper end of the piece A B, a piece, D D, is to be morticed, and in it the centre K taken, so that O P may be about six inches, and the angle K O P about 40 degrees. On this centre K, the ruler or index K L is to move, having a fiducial edge below answerable to the central point, to cut the graduations on the limb. On the upper end of this index a speculum of silvered glass, or rather metal, exactly plain, E F, of about three inches in length and two in height, is erected perpendicular to the plane of the index, and also nearly at right angles with its sides, the plane of the reflecting surface standing exactly over the central point. At the end B, of the piece A B, another speculum of glass is to be in the same manner erected, which may be somewhat less than the other, with a square or oblong spot in it unsilvered, that a star, by a direct ray, may be seen through it; and the back of this speculum should be guarded with a thin brass plate, with an aperture in it equal to the unsilvered part of the glass; the edge of the aperture toward H to be exactly straight, dividing between the silvered and unsilvered part of the speculum, and standing in the line of the axis of the telescope. This speculum is to be set at an angle of about 20 deg. with the square of the piece A B, or at 110 deg. with the sides of it. Upon the piece A B, the telescope P Q is fixed, of a good aperture and field, with the axis placed as above. The limb is to be graduated by diagonals, or parallel circles, to half degrees and half minutes, beginning from C, which are to be numbered as whole ones. And if it be practicable to face wood with brass without warping, the whole face should be so covered; if not, then along the outward edge of the limb a narrow strip of brass plate may be let into the face of it, finely and equally indented on the edge, to take a screw fitted to that toothing to be fixed on the moving index at L, as your instruments are made that count by revolutions; and then, before this is used, it would be proper to take the distance of the two objects first nearly by a fore-staff, and from thence accordingly



to set the index. This screw, at land, would be highly useful, but at sea it cannot be wrought, while the instrument is directed by the same person, though, as the motions of the moon and variation of the angle is but slow, it may be brought to exactness by several trials in the intervals of direction. The instrument, as above described, will not take an angle of much above 50 degrees, which, for the purpose intended, may be fully sufficient. But if the speculum E F be made to take off and put on, and the end of the index at K be so notched as to turn that speculum from its first perpendicularity, to make an angle of about 25 degrees, it will then take any distance to 100 degrees.

By this description it may be thought that the utmost accuracy will be required in making the instrument: yet, of all that ever have been invented of so curious a kind, it will probably be found to demand the least; for provided the speculums are good, on which the whole depends, if the first E F be set truly over the centre, the limb well graduated, and the other speculum be also set perpendicular, there can, I think, be no other error but what the instrument itself will easily rectify: for if it be directed to one star, and that be taken, at the same time,

both by a direct ray through the glass G H, and by a reflection from E F, both exactly coinciding at O, it is evident that then the speculums are exactly parallel.—And if this falls not precisely when the index cuts 0 degrees, if the variation be noted, this constantly added or subtracted, according as it falls, will fully rectify all other errors. So in fixing the speculum E F to another angle, as has been proposed, the like method may or must be taken, viz. to observe two stars at the distance of about 45 or 50 degrees, by the speculum, in its first situation, and then the same stars by it again in its second, and the difference of the intersection of the index on the limb being noted, and constantly added to the arches taken in the second situation, will give the true distance.—This method of observing one and the same star, in the first manner, or two stars in the second, as has been mentioned, will also rectify errors even in the speculums: for the line of the ray K O is in all cases constantly the same; and, upon the whole, I may safely say the instrument will be found much more certain in practice than at first it may appear in theory, even to some good judges. But I am now sensible I have trespassed in being so particular when writing to Dr. *Halley;* for I well know that, to a gentlemen noted for his excellent talent of reading, apprehending, and greatly improving, less would have been sufficient; but as this possibly may be communicated by thee, I shall crave leave further to add, that the use of the instrument is very easy. For if the index be set so near the distance of the moon and stars, and the limb so held as to cut the body of the moon, upon directing the telescope to the star, her image will, of course, be reflected on some part of the speculum G H. There is no absolute necessity the star and moon should coincide exactly at the line limiting the silvered and unsilvered part of the latter speculum; for the transparent part of that glass will often reflect the moon's image sufficiently for the telescope to take it, and if her limb in that and the star exactly coincide near it, it may be sufficient, though the nearer to that line the better. Now their distance being found, the tables that give the moon's place may be depended on for her diameter and her latitude, which last being known, there are three sides of a triangle given to find the angle at the pole of the ecliptic, which, compared with the star's longitude, determines her place for that instant: for, in respect to her latitude when she is swiftest in motion, when nearest her nodes, and when the inclination of the orb is greatest (if these could all happen together), yet the variation of her latitude, in the space of one hour, equal to 15 deg. of longitude on the earth, if a star be taken somewhat near the ecliptic, and not very near the moon, will not alter the angle at the pole but a very few seconds. The nearness of the speculum G H is no disadvantage, because the rays come reflected in the same manner as they come direct. It may be needless to add that, when practicable, the moon should be taken when near the meridian—or that the instrument will equally take the distance of the sun from the moon, when visible, as she often is, in the day-time; for which purpose there must be a place made at M for a darkening glass, to be fixed there when necessary, and the telescope directed to the moon. Nor need I add, that the same instrument will very well serve for taking the distance of any two stars, a comet, &c. always taking the brightest by reflection; all which is obvious. But I must further observe, with pleasure, that if we do not quite mistake in all that has been said here, there is now a method found by it to obtain what is equivalent to a bodily appulse of the moon to a fixed star, or to the sun at any moment when visible, which indeed might be wished; but could scarce be hoped for by any means to be used at sea, and therefore, if the longitude could ever be expected to be determined by the motions of the moon (to which end J. Flamstead's and thy more assiduous labours in observing her, have, I suppose, been principally levelled), and this instrument be duly made to answer what is proposed, as it may be framed light and easily manageable, thou wilt then, with thy accurate tables, have obtained the great desideratum, and all that can in this way be had from our satellites. And if the method of discovering the longitude by the moon is to meet with a reward, and this instrument, which, for all that I have ever read or heard of, is an invention altogether new, be made use of, in that case I would recommend the inventor to thy justice and notice. He now gets his own and family's bread (for he is married) by the labour of his own hands only, by that mean trade. He had begun to make tables of the moon, on the very same principles with thine, till I lately put a copy of those that have lain so many years printed, but not published, with W. Inny's, into his hands, and then, highly approving of them, he desisted. We both wish very much to see thy tables completed, and ushered into the world by thy own hand. On thy receipt of this I shall hope for a line, with thy thoughts on it, which, however they prove, will afford a pleasure to

Thy real friend, J. LOGAN.

Pennsylvania, May 25, 1732.

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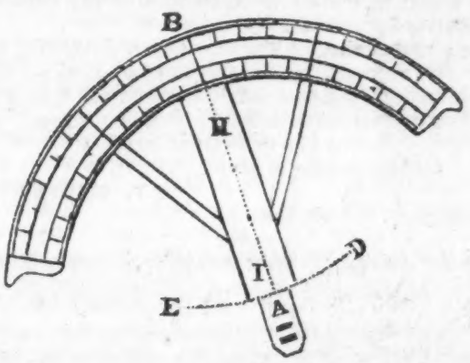
To the Royal Society.

Gentlemen,—As none are better able than the Royal Society to prove and judge, whether such inventions as are proposed for the advancing useful knowledge will answer the pretensions of the Inventors, or not; and as I have been made acquainted (though at so great a distance) of the candour of your learned society in giving encouragement to such as merit approbation, I have, therefore, presumed to lay before the society the following, craving pardon for my boldness.

Finding by what difficulty a tolerable observation of the sun is taken by *Davis's* quadrant, and that in using it, unless the spot or shade be brought truly in the line of the horizon-vane, the observation when made is good for nothing, to do which requires much practice, and at best is but catching an observation; considering farther the smallness of the 60° arch and the aptness of the wood to cast, which makes often little better than guess work; I therefore applied my thoughts upwards of two years since, to find a more certain instrument, and contrived the following improvement, as *I* think, in the make and use of the bow, viz.



The quadrant is to be numbered from each end to 90 at the other, as in the figure. The sight and glass vanes are the same with the common, excepting that the glass should be larger and, I think, it would be better if ground to the segment of the cylinder. The horizon vane should be like that in the figure thereof; having three holes IKL, one hole I to fit on the centre of the quadrant A, the other two KL to see the horizon through, whose length across the vane may be ⅓ of the radius AB or more; the horizon vane should be a little hollowed, answerable to the curvature of the circle DAE, or cylinder whose semi-diameter AH is about 7-11 of AB the radius of the quadrant.

In observing with this quadrant at sea let the sight and glass vanes be kept nearly on the same numbers, or at equal distances from the ends of the arch, and then it will be sufficiently exact to bring the spot and horizon in a right line, or any part of the horizon vane, by mov-

ing the vanes nearer together or further apart, the middle of the horizon vane being parallel to the horizon, then the zenith distance will be the sum of the distances of the vanes from the ends of the quadrant arch. For, putting r=the radius of the quadrant, a=the distance of the spot from the middle of the horizon-vane, s=the sine and c=the cosine of half the sun's altitude, unity being radius, the sine of the error will be nearly equal to $c\frac{\overline{11}}{14} \times \frac{28aa}{rr}$, and therefore, when greatest, (which is when the zenith distance is 00,00, or 47° 45′) of the distance of 1-16 of the radius of the quadrant from the middle of the horizon-vane, it is but 1-30; I would advise to bring the upper or lower edge of the spot, and not the middle and horizon, in a right line, and then subtract or add 16 minutes for the sun's semi-diameter from or to the zenith distance given by the vanes.

NB. There should be an allowanc for the observer's height above the surface of the sea, by subtracting 4, 5, or 6 minutes. A table of this kind would not be amiss on the back of the quadrant.

There may be some graduations put on the staff near the centre to be cut by a plumb-line hung, or a pin put into a small hole for land observations. One of these quadrants, between 18 inches and 2 feet radius, if well graduated, will be sufficient to take the sun's zenith distance within two or three minutes.

Succeeding so well with the sun, encouraged me to undertake what appeared a more difficult task, the finding some way to take the altitude of the stars at sea (when the horizon may be seen) better than by the fore-staff, which, I concluded, must be by bringing the two objects, horizon and star together. I first considered one reflection; but the faults of *Davis's* quadrant were here enlarged, which is chiefly the flying of the objects from each other by the least motion of the instrument.

I then examined what two reflections would do, which perfectly answered my desire, being equally useful in taking the distance of stars from each other, and also from the moon, and I believe practicable at sea; for I found that when one star was made to coincide by two reflections with another, the distance of those stars would be double the inclination of the reflecting planes, as may be easily demonstrated.

I see but one fault in this instrument, and that is, that three feet radius in this has a graduation no larger than a quadrant of 18 inches radius. I hope Dr. Halley has received a more full account of this from I. Logan, esq. therefore, I shall add no more than that I am

Gentlemen, yours &c.

T. GODFREY.

Philadelphia, Nov. 9, 1734.

A further account of Thomas Godfrey's Improvement of Davis's Quadrant transferred to the Mariner's Bow.

Being informed that this improvement, proposed by *Thomas Godfrey* of this place, for observing the sun's altitude at sea, with more ease and expedition than is practicable by the common instrument in use for that purpose, was last winter laid before the royal society, in his own description of it, and that some gentlemen, wished to see the benefit intended by it more fully and clearly explained, I who have here the opportunity of knowing the author's thoughts on such subjects, being persuaded in my judgment, that if the instrument as he proposes it be brought into practice, it will in many cases be of great service to navigation, have, therefore, thought it proper to draw up a more full account of it than the author himself has given, with the advantages attending it, which if approved of by better judgments, to whom what I offer is entirely submitted, it is hoped the use of it will be recommended and further encouraged, as well as the author. The rise of the improvement with its convenience, as also a description of it, are as follows:

Thomas Godfrey having under the greatest disadvantages (as I observed in my first letter to Dr. Halley, giving an account of the invention of the reflecting instrument) made himself master of the principles of astronomy and optics, as well as other parts of the mathematical science, applied his thoughts to consider the instrument used in that momentous part of business, navigation. He saw that on the knowledge of the latitude and longitude of the place a ship is in, the lives of thousands of useful subjects as well as valuable cargoes continually depend; that for finding the first of these, certain and easy methods are furnished by nature, if observations be truly made. But *Davis's* Quadrant, the instrument used by British navigators (though seldom by foreigners) he perceived was attended with this inconveniency, that the observer must bring the shade or spot of light from the sun, and the rays from the horizon, to coincide exactly on the fiducial edge of the horizontal vane; that though this can be done in moderate weather and seas, with a clear sky and when the sun is not too high, without any great difficulty; yet, in other cases, it requires more accuracy, than can in some junctures possibly be applied, and more time than can be allowed for it.

In European latitudes, or to those in the northern tropic, when the sun is in the southern signs and near the meridian, he rises and falls but slowly. Yet in voyages to the East and West Indies, of which very many, especially to the latter, are made, he is at noon often and for many days together, in or near the zenith; and when approaching to, or leaving it, he rises and falls, when he has declination, faster than even at the horizon. For it is well known to persons acquainted with the sphere, that when his diurnal course takes the zenith, he there rises and falls a whole degree or 60 minutes in 4 minutes of time, so that the observer has but one minute to come within 15 minutes of the truth in his latitude; while in a middle altitude, as 45 degress, he is at noon above five minutes and a half in time in rising or falling one single minute of space, the odds between which is more than 8 to 1.

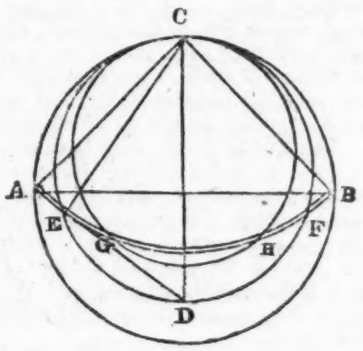
I say all these things are well known to astronomers, and yet perhaps no parts of the world require more exactness in taking the latitude, than is necessary in voyages to the West Indies; for it is owing to the difficulty of this that vessels have so frequently missed the Island of Barbadoes, and when got to the leeward of it have been obliged to run down a thousand miles farther to Jamaica, from whence they can scarce work up again in the space of many weeks against the constant trade winds, and generally decline to try for, or attempt it.

But farther, as the latitude cannot be found by any other method that our mariners are generally acquainted with, than by the sun or a star on the meridian; it is obvious that in a cloudy sky, when the sun can but now and then be seen, and that only between the openings of the clouds for very short intervals, which mariners know frequently happens; as also in high tempestuous seas, when, though the sun should appear, the observer can scarcely keep his feet by any means; I say on these accounts, it is obvious that it would certainly be of vast advantage to have an instrument by which an observation could also be, as it were, snatched or taken in much less time than is generally required in the use of the common quadrant.

Thomas Godfrey, therefore, considering this, applied himself to finding out some contrivance by which the necessity of bringing the rays from the sun, and those from the horizon to coincide (which is the most difficult part of the work) on one particular point or line for a centre, might be removed. In order to which, he considered, that by the 21st, 3 element, *Euclid*, all angles of the periphery of a circle, subtended by the same segment within it, are equal on what ever part of the circumference the angular point falls; and therefore, if instead of a quadrant, a semicircle were graduated to 90° only, accounting every two degrees but one, this would effectually answer; for then if an arch of the same circle

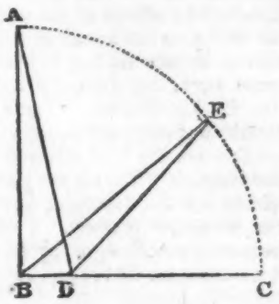
were placed at the end of the diameter of the instrument, every part of the opposite arch would equally serve for taking the coincidence of the rays above mentioned. But such an instrument would manifestly be attended with great inconveniency; for it would in great altitudes be much more unmanageable, and the vanes could not be framed to stand, as they always ought, perpendicular to the rays. He, therefore, farther resolved to try whether a curve could not be found at the centre of a quadrant which would, at least for a length sufficient to catch the coincidence of the rays with ease, fully answer the intention.

A curve that in all its parts would, in geometrical strictness, effect this, cannot be in nature, any more than one and the same point can be found for a centre to different circles whose circumference are not parallel. It is certain that every arch on the limb may have a circle that will pass through the centre and be a locus, or geometrical place for the angle made by that arch to fall on, but then every arch has a different one from all others, as in the figure.



Let ABC be the quadrant, and AB, EF, GH be taken as arches of it. Circles drawn through each two of these respectively, and through the centre C as a third point, will manifestly be such loci of places: For every pair of these points stand in a segment of their own circle, as well as on a segment of the quadrant, and therefore by the cited 21, 3 *el.* the angles standing on these first segments will every where be equal at the periphery of their respective circles, and their radius will always be equal to half the secant of half the arch on the quadrant. In the circle CEDF (for instance) the angle CED is right quadrant, because in a semicircle; CE is the radius of the quadrants, ED the tangent of the angle ECE=½ the arch EF; and CD is the secant of the same=the diameter of the circle CEDF, and therefore its radius is half that secant.

Now, from the figure it is plain, that in every small arch the radius of their circular place will be half the radius of the quadrant. that is, putting this radius=10, the other will be 5 and the radius for the arch of 90° (the highest to be used on the quadrant) will be the square root of half the square of the radius=sine of 45° =7.071; and the arches of the centre, drawn by these two radii are the extremes, the medium of which is 6.0355. And if a circular arch be drawn with this radius 1-20th part of the length of it, that is, in an instrument of 20 inches radius, the length of one inch on each side of the centre, affording two inches in the whole to catch the coincidence of the rays on, which must be owned is abundantly sufficient; the error, at the greatest variation of the arches, and at the extremity of these two inches, will not much exceed one minute: But in fixing the curvature or radius of this central arch, something further than a medium between the extremes in the radius is to be considered; for in small arches the variation is very small, but in great it equally increases as in the figure where it appears the difference between the anglesABC and ADC is much greater than the difference EBC and EDC, though both are subtended by the same line BD; for their differences are the angles BAD and BED.



Therefore this inequality was likewise to be considered, and compounding both together, *Thomas Godfrey* pitched on the ratio of 7 to 11 for the radius of the curve to the rad. of the instrument, which is 6.3636 to 10. But on further advisement he now concludes on 6 6-40, and a curve of this radius, of an inch on each side of the centre to an instrument of 20 inches radius, or of 1-20th of the radius whatever it be, will in no case whatever (as he has himself carefully computed it) produce an error of above 57″, and it is very well known that navigators do (as they very safely may) slight a difference of one minute in latitude.

This radius is the true one for the circular place to an arch of 77° 15′ and the variation from it is nearly as great at 90° as at any arch below it, the greatest below being at about 44°, which is owing to the differences expressed by the last figure above, and not to those of the curvatures or circular places.

Yet this variation of 57 seconds arises only when the spot or coincidence falls at the extremity of the horizontal sight or vane, or a whole inch (in an instrument of 20 inches rad.) from the centre and then only in the altitudes or arches of above 44 or 90°, and in these, at the distance of half an inch from the centre, the variation is but ¼ so much, viz. about 14″ and at ¼ of an inch not 4″. At the centre it is precisely true. Therefore, an observation may be taken with it, in one-fourth of the time that *Davis's* quadrant, on which three things must be brought to meet, in a general way requires.

Considering this, and the vast importance of such dispatch, in the case of great altitudes or of tempestuous seas, or beclouded skies, it is presumed, the instrument thus made, will be judged preferable to all others of the kind yet known.

Some masters of vessels who sail from hence to the West Indies have got some of them* made, as well as they can be done here, and have found so great an advantage in the facility and in the ready use of them in those southerly latitudes, that they reject all others. It can scarce be doubted, but when the instrument becomes more generally known, it may, upon the Royal Society's approbation, if the thing appears worthy of it, more universally obtain in practice. It is now four years since *Thomas Godfrey* hit on this improvement: for his account of it, laid before the Society last winter, in which he mentioned two years, was wrote in 1732; and in the same year, 1730, after he was satisfied in this,† he applied himself to think of the other, viz. the reflecting instrument by speculums for a help in the case of longitude, though it is also useful in taking altitudes; and one of these, as has been abundantly proved by the maker, and those who had it with them, was taken to sea, and there used in observing the latitude the winter of that year, and brought back again to Philadelphia before the end of February, 1730-1, and was in my keeping some months immediately after.

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* Godfrey's instruments.

† That is, I suppose, being "satisfied," that he had made a real *improvement* in the Quadrant. E. H.

*It was indeed unhappy, that, having it in my power, seeing he had no acquaintance nor knowledge of persons in England, that I transmitted not an account of it sooner. But I had other affairs of more importance to me; and it was owing to an accident which gave me some uneasiness, viz. his attempting to publish some account of it in print here, that I transmitted it at last, in May, 1732, to Dr. Halley, to whom I made no doubt but the invention would appear entirely new; and I must own I could not but wonder that our good will at least was never acknowledged. This, on my part, was all the merit I had to claim, nor did I then, or now, assume any other in either of these instruments. I only wish that the ingenious inventor himself might, by some means, be taken notice of, in a manner that might be of real advantage to him.

There needs not, I suppose, much more of a description of the instrument than has been given. I shall only say that the bow had best be an arch of about 100 degrees well graduated and numbered both ways; the radius 20 or 24 inches; the curve at the centre to be one-twentieth of the radius on each side, that is, one-tenth of it in the whole; the radius of that curve 64-100 parts of the radius of the instrument; that the glass for the solar vane should not be less, but rather larger than a silver shilling with its vertex very exactly set, and that the utmost care be taken to place the middle of the curve at the centre exactly perpendicular to the line or radius of 45 deg. as the observer must also take care that the two vanes on the limb be kept nearly equidistant from that degree. To which I shall only add, that it may be best to give the horizontal vane only one aperture, not two. The rest, I suppose, may be left to the workman. Thus, doubting I have already been too prolix on the subject, to which nothing but a sincere inclination to promote any thing that might contribute to a public benefit, and to do some justice to merit, could induce me, I shall only request that what I have here offered may be construed by that intention.

J. LOGAN.

Philadelphia, June 28, 1734.

P. S. [*By the Editors of the Magazine.*] It is easy to see, by a careful perusal of these two letters, and that in our last Magazine, the progress of this invention, and how far Mr. *Godfrey* ought to be considered as the inventor. It is our business to give impartial accounts of facts and transcripts of authentic papers. The reader, after that, is to judge for himself. For our own part, we have no hesitation in pronouncing Mr. *Godfrey* the real original inventor of this famous and useful instrument.

The subjoined extracts are from "Miller's Retrospect."

"Alderman *Hillegas*, of this city, (Philadelphia) knew *Godfrey*. He says he remembers to have heard, perhaps 50 years ago, that, as *Hadley* had obtained the patent, complete justice could not be done to *Godfrey;* but that the Royal Society, thinking his ingenuity ought to be rewarded, either subscribed for him as individuals, or gave him out of their funds, £200 sterling: and knowing his infirmity (for it seems he was apt to indulge in intemperate drinking), they thought it better to send the amount in household furniture than in cash, and, *inter alia*, sent him a *clock*, which the Alderman remembers to have seen."

Godfrey had a son, *Thomas Godfrey*, jun. who, in 1765, published a volume of *Juvenile Poems*. The young man is spoken of, by the writer of the preface, as possessing great natural endowments, with but little cultivation; and as deserving to be ranked, as well as his father, among the *curiosities* of Pennsylvania.—*MS. Letter of the Rev. Dr. Eliot, of Boston, to the Author.*

It is worthy of notice, that the use of the *Quadrant* in question was confined to the English nation until the year 1736, when *M. D'Apres de Mannevillette*, the great maritime Geographer, employed it on board a French ship; and on his return to France, one of the earliest objects of his attention was to state, in a public print, his high estimation of the curious instrument. He thus had the honour of introducing to his countrymen one of the most valuable inventions of the age.

PITTSBURG MANUFACTURES.

The indefatigable and enlivening spirit of industry, which distinguishes Pittsburg and its vicinage, has recently brought into operation the "Fort Pitt Glass Works," situated about a mile from the city. Messrs. Price, Curling, & Co., the enterprising proprietors of this establishment, have, within a few days past, produced the first specimens of their manufacture, which afford ample evidence of their skill, and of the perfection to which their fabric will attain, when they shall have surmounted the obstacles incident to the first essays in an undertaking resembling the one on which they have adventured. The articles which they have already completed, are equal in quality and appearance to any, in a similar branch of manufacture, that have been produced in the Western country. The glass is of a beautiful transparent whiteness, and so excellent in texture and polish, that it might bear off the premium at any exhibition of domestic manufactures, although opposed by the *positive* celebrity of Boston, and the asserted *superlative* excellence of England.

The founders of the "Fort Pitt Glass Works" merit every encouragement for their establishment. It is their intention to conduct it, so as to acquire for its productions a character equal to that of any manufactory of a similar kind in the United States; and, with the skill and experience which they are admitted to possess, and the spirit with which they have entered upon their enterprise, they may confidently anticipate success.

Mr Price, one of the proprietors, was engaged in the manufacture of glass at the works of the late Col. O'Hara, when our flourishing emporium bore the name of "Fort Pitt." His predilection for his early pursuits and place of residence, has induced him to revive, in the new works, of which he is one of the builders and proprietors, the name that attached to our Western Birmingham in the olden time.

Near the "Fort Pitt Glass Works," Messrs. Frost and Vodrey, from Staffordshire, England, have within a few months, since the commencement of their undertaking, brought the manufacture of earthen ware into successful operation. The writer of this notice was invited, a few days since, by some friends of these gentlemen, to visit the manufactory and examine its productions. The result of the examination was very gratifying to all the visiters. It is, indeed, surprising to observe to what a degree of perfection the spirited manufacturers have already attained, in the execution of their ware. Considering the numerous and obstinate difficulties which they have had to encounter, in obtaining materials, adapted to their purposes, and putting into operation the incipient processes of a species of manufacture heretofore entirely unkown to the Western country, they have obtained a success, which is at once honourable to themselves and auspicious for the manufacturing interests of Pittsburg. As soon as they can procure a competent supply of suitable clay, and a sufficient number of artisans to execute all the various parts of the manufacture, they contemplate the fabrication of earthen ware, in all respects similar to that for which Staffordshire is so much celebrated.—*Gazette.*

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* All these circumstances of Mr. Logan's complaint, and almost every thing that follows to the end, except the directions for making the instrument, are left out of the account published in the *Philosophical Transactions*, which strengthens the conjecture that justice has not been done to the original inventor.

EARLY SETTLEMENT.

[*Continued from page* 181.]

Passing over a lapse of nine years, during which the Dutch and Swedes were proceeding in their settlements, the former as traders on the borders of the bay, the latter as husbandmen on the freshes of the river, while the sturdy Stuyvesant was stoutly maintaining his rights, a new era would commence about the year 1664, when Sir Robert Carr sailed up the river and took possession of the fort at Newcastle; and here the antiquary would be delighted to retrace and review the memorials of the middle age of this ancient place, now called by the English *Delaware Town*. The spot where *William Penn* was first to place his foot upon American ground; with its venerable house of worship, noticed by the Founder on his arrival, its old court house, and other objects of interest, as they then appeared.

While in the neighbourhood the industrious investigator would not fail to visit the site of *old Christiana*, and although every trace of the primitive buildings were gone, endeavour to find some relique of the bulwark or vaulted magazine described by Kalm in 1748. The old Swedish Church mentioned by W. Penn, would engage his attention, on part of the domain of which Wilmington was founded in 1733.

Old Upland would next invite inquiry, as the *first* resting place of the *first* English settlers. The *first* seat of the provincial government under *Penn*, and where the "great law" was proclaimed in 1682; with its meeting house, and hall of legislation, its "Essex House," the hospitable mansion of *Wade*, where the Founder of Pennsylvania resided, and the *mill* erected under his immediate eye.

At *Helsinburg* and *Salem*, if the antiquary should not think it profitable to seek the lost capital of New-Albion or the still greater antiquities hinted at by Kalm, he could not but discover some objects worthy of attention in the town founded by Fenwick so early as 1675, the first place settled by the English in *West* Jersey.

Above, on the same shore, *Swedesbro'*, formerly *Raccoon*, a place frequently visited by Kalm for the purpose of inquiry, was some of the earliest settlements of the Swedes, who, of course, had their church. It was here, too, that the English settlers, before Penn, passing up to Burlington, stopped for rest and refreshment.

Little Gloucester would receive its passing tribute of respect, as the *first* spot settled on our river; if not for having been the only fashionable watering place known to the ancient Philadelphians, and as such eulogized by the historian, and sung by the poet.

Burlington, formerly *Bridlington*, but originally *New Beverly*, founded on the island of the Indian King *Chygoes*, a short time after Salem, would claim attention with its antiquities, as mentioned by Thomas; its "stately house; and great market place, with a hall over head for the sessions, its bridges *London* and *York*, and its palaces built by the gentry."

On the opposite side of the river near the "lower falls," the inquirer would look with anxiety for the remains of those venerable buildings used for the purpose of worship by the *Friends*, before Pennsylvania *was*—and perhaps before the most ancient of the houses of this character, at Shackamazon and Upland.

Returning down the shore, *Pennsbury Place* would excite to sedulous research; it was the residence of Wm. Penn, begun under the direction of his relative Markham, before the governor's arrival.

In its lofty halls he often gave audience to the princes of the land, having here concluded no less than nineteen treaties with the natives. The mansion house is said to have been a great and stately pile, built of materials brought from Europe. If tradition be credited it was at Pennsbury Manor, on a stream called Pennsbury, Philadelphia, agreeably to the founder's first design, was to have been built. Another site for the intended metropolis is supposed to have been on an elevated spot on the lower side of *Poetquessing* creek.

These, with perhaps other places of note, would occasionally arrest the progress of the curious investigator, before the city itself—our fair and beautiful city, arose to his delighted eyes, out of the very bosom of the wilderness.

And here with what intense curiosity would its origin be observed, and its progressive details be pursued.

First, would appear the shore, so soon to be transformed by the magic of civilization, stretched out in rude magnificence, its "groves of tall pines" in their dark ever green; and its overhanging woods reflected, in their gorgeous autumn livery, from the noble stream that laved its banks. The dense forest here and there penetrated and broken by the arts of cultivation; and clusters of humble cabins seen mingling with its various foliage. On the north the town of the Shackamazons, near the stream, perhaps of their name; a little below, the modest mansion of the *friend* almost hidden by the spreading branches of *The Elm* about to become so celebrated. Perhaps an Indian village on the little stream of *Coaquenaku*. Below the *Wicacoa*, Swedeshill, crested with tall forests, and, on its brow, the scattered hamlets of the Swedes, the antique hall of the sons of *Suen*, and the primitive Swedish church in the form and equipment of a military blockhouse.

Such might have been the scene, when the eventful landing near *Wicacoa*, in 1682, imparted to it a new and animated aspect.

Then, as the good ship *Welcome* rides gallantly at her anchorage, and her boats are busily passing to and fro, parties of the natives may be seen, coming round the headlands in their canoes, landing in the coves, or winding down the hills in their lengthened line of march.—The pious emigrants have now returned thanks to their Heavenly Pilot, and are dispersed about in anxious groups of men and women and children—traversing the sandy beach, climbing the steep bank, or piercing the tangled thicket. English, Swedes, Hollanders, Welsh, Indians, in all their variety of costume and character, are seen mingled with the English strangers, busily assisting them in every mode of preparation to meet the novel exigency. Conveying their effects from the lighters, or arranging them on the beach, or the bank; in building the fire, or felling the tree, or collecting the branches, or the bark, or the sod; in scooping out the cave, or constructing the light Indian shanta. Perhaps a boat from Jersey is just touching the strand, while outstretched arms and streaming eyes, bespeak the meeting of long severed friends or relatives; and in more than one retired spot along the shore, affectionate and faithful hearts are mutually pouring forth feelings which time and absence have failed to weaken, or to chill. If the form of William Penn be required, to give completion to the picture, the Founder may be seen as followed by his companions of the voyage, he is conducted by the hospitable Swedes towards the hamlets on the hill; or as he rests on its side, beneath an aged sycamore, surrounded by a group of curious and delighted natives.

PENNSYLVANIA CANAL AND RAIL ROAD *BILL.*

Passed March 1828.

An act relative to the Pennsylvania canal, and to provide for the commencement of a rail road to be constructed at the expense of the state; and to be styled the Pennsylvania rail road.

Section 1. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania, in General Assembly met, and it is hereby enacted by the authority of the same, that the board of canal commissioners are hereby authorised and required, in behalf of this commonwealth, as speedily as may be, to locate and

contract for making canals, locks and other works necessary thereto, from the commencement of the Pennsylvania canal, at or near the mouth of the river Swatara to Columbia, in Lancaster county, from Lewistown to the highest point "expedient and" practicable for a canal on the Juniata, from a point at or near Northumberland to the Bald Eagle; on the West Branch from Northumberland to the New York state line; on the north branch from a point at or near Taylor's ferry to Easton, and from Blairsville to the highest point "expedient and" practicable for a canal on the Conemaugh; provided that ten miles of the canal from Swatara to Columbia, not more than twenty-five, nor less than twenty miles on the West Branch, and not more than forty-five miles nor less than fifteen miles of each of the other sections aforesaid, shall be put under contract during the present year; and provided further, that so much of the feeder from French creek to the summit level at Conneaut lake, as is necessary to the completion of the same shall be put under contract within the present year.

Sect. 2. And be it further enacted by the authority aforesaid, that the board of canal commissioners are hereby authorised and required, previous to the location of that part of the canal, from a point at or near Northumberland "to the Bald Eagle" on the West Branch, to cause a survey and explanation "by an engineer" on the west side of the West Branch, from a point at or near Northumberland to the Bald Eagle, and the said board, after taking into view the relative advantages, facility, cost of construction and interests of the commonwealth, shall decide whether the canal shall be located on the eastern or western side of the said West Branch of the Susquehanna.

Sect. 3. And be it further enacted by the authority aforesaid, that the canal commissioners shall cause further examinations to be made between Easton and Carpenter's Point on the Delaware river, with a view of constructing a canal of smaller dimensions, with locks of nine feet width, and "make report to the next session the result of said examinations, stating whether the canal is practicable or not, and at what total expense, designating the estimates of the expense of each mile, separately, and giving the items, and also stating the dimensions of the canal and works so estimated, and" the said canal shall be located, but no part of it put under contract during the present year.

Sect. 4. And be it further enacted by the authority aforesaid, that the board of canal commissioners are authorised and required, to locate by the most eligible route, a rail road across the Allegheny mountain, with a view of connecting the Juniata and Conemaugh sections of the Pennsylvania canal, and they are further authorised to make such contracts as will secure the completion of said rail road, as early as the completion of the said sections of canal.

Sect. 5. And be it further enacted by the authority aforesaid, that the canal commissioners are authorised and required to locate upon the most eligible route, a rail road from the city of Philadelphia through the city of Lancaster to Columbia, on the Susquehanna, and from thence to the west end of the borough of York, in the county of York, "such part of which east of the Susquehanna, shall be put under contract within the present year, as the canal commissioners may deem expedient, with a view to its completion within two years, or as soon thereafter as practicable:" provided, That if the canal commissioners shall deem it most expedient to locate the said rail road, where the same shall pass through the city of Lancaster, north of James street, the privilege is hereby granted to the corporation of the city of Lancaster to intersect the same by a lateral rail road through the said city, from the said Pennsylvania rail road to Conestoga river, in such manner as may be approved by the board of canal commissioners, and not otherwise.

Section 6. And be it further enacted by the authority aforesaid, That the canal commissioners are authorised, and required, to cause examinations, surveys, "levels" and estimates to be made, along the valley of the Monongahela, from Pittsburg to the Virginia state line, and from the borough of Columbia to the mouth of the Conestoga river in Lancaster county, with a view of ascertaining the most eligible mode of effecting a navigable communication, either by a canal or slack water navigation; and also examinations, surveys and estimates, from "Huntingdon through Woodcock valley and Bedford, by the head waters of the Allegheny to Johnstown in Cambria county," with a view of connecting those streams, either by a canal or rail road, "also examinations, surveys and estimates from Lewistown by the Kishacoquillas creek, and through the valley of that name, to the town of Huntingdon, with a view to ascertain the best ground on which to locate the Pennsylvania canal," and also surveys, examinations and estimates from some points on the Schuylkill canal, to a point or points on the Susquehanna river, between Catawissa and Sunbury, with a view of connecting those points by a rail road; and that the canal commissioners are authorised and required, to cause examinations, surveys and estimates to be made, from the west end of the borough of York through Gettysburg to Chambersburg, "and also from a point at or near the west end of Harrisburg bridge, through or near Carlisle to Chambersburg," for the purpose of constructing a rail road," and the said commissioners shall also cause to be made the examinations and surveys between the Lehigh and the North branch of the Susquehanna, provided for, in, and by the third section of an act, approved the eleventh day of April, eighteen hundred and twenty-seven, entitled, "an act to provide for the further extension of the Pennsylvania canal," and the said commissioners shall report in like manner as is directed by law, in relation to other routes, "Provided, That in contemplation of a slack water navigation on the Monongahela, the commissioners' report shall contain, in addition to the other proper and necessary matters, precise accounts of the number of dams and locks, necessary to be erected, their respective dimensions, their localities, the materials of which they should be constructed, and the plan, manner and estimated expense of the same, separately; and further the plan shall be so arranged if practicable, as to preserve from injury the mill works and water power now in use on said river. The report to be made to the next session of the legislature."

Section 7. And be it further enacted by the authority aforesaid; That the canal commissioners shall cause further examinations, surveys and levels to be made, along the valley of the Allegheny river, from the mouth of the Kiskeminetas to the mouth of French creek, and shall report to the next general assembly upon the practicability and estimated cost of making a canal between the said points, also upon the practicability and the "estimated" cost of improving the navigation of said river "for steam boats," by dams and locks, between the said points, "also upon the practicability and the estimated cost of improving by dams and locks, the navigation of the said river, for common canal boats, between the said points," and also upon the practicability and" estimated, cost of making a navigable communication between the said points, partly by canal, and partly by dams and locks, And that the canal commissioners are authorised and required to cause further examinations, surveys and estimates, to be made of the Ohio river, from Pittsburg, to or near the mouth of Beaver creek, for the purpose of ascertaining whether the navigation of said river can be improved at a less expense than by constructing a canal the whole distance between said points, and to report to the next legislature the practicability and cost of the same.

Sect. 8. And be it further enacted by the authority aforesaid, that the canal commissioners be, and they are hereby required, during the ensuing year, and previous to final location and letting under contract, to call upon and receive, or cause to be called upon and received, from all and every person or persons, as far as may be

practicable, who are, or who may be owners of lands, lots, or buildings, along or near the several proposed lines of canals and rail roads, as provided to be made, or examined by the provisions of this act, acquittances or releases, in whole or in part from any claim to damages which might accrue in consequence of the construction of any part of the contemplated works, and for materials that may be taken to carry on the construction of the same, and in all cases, where the demands for damages are great or exorbitant, or where there is good reason to believe, that such demands will be great or exorbitant, it shall be the duty of the board of canal commissioners to direct an inquiry and examination to ascertain if there is any other practicable route which would equally subserve the public advantage; and if so, that route shall be preferred, on which the damages will probably be the least: provided, that in all such decisions, due regard shall be had to distance, cost, permanency, facility of transportation, and all other considerations affecting the public interest: And provided, that the mere authority to locate, shall not be construed as giving authority to let under contract.

Sect. 9. And be it further enacted by the authority aforesaid, that the governor be, and he is hereby authorised to borrow, on the credit of the commonwealth, a sum or sums, in the whole not exceeding two millions of dollars, and the sum or sums so borrowed, shall be paid to, and vested in the commissioners of the internal improvement fund, to be applied by them, in the manner, and for the purpose hereinafter directed: provided, that no engagement or contract shall be entered into, which shall preclude the commonwealth from reimbursing any sum or sums thus borrowed, at any time after the expiration of twenty-five years from the first day of December next; "and in case offers shall not be made within the time specified by the governor for receiving the same, for loaning the whole sum proposed at any one time to be borrowed, at an interest not exceeding five p. cent. per annum; then such proposals as may have been made for loaning at an interest not exceeding five p. c. per annum, sums of one thousand dollars or more, but less in the aggregate than the whole amount proposed to be borrowed, shall be considered as accepted, and such persons notified accordingly."

Sect. 10. And be it further enacted by the authority aforesaid, that the governor be, and he is hereby authorised to cause to be constituted, certificates of stock, signed by the Auditor General, and countersigned by the State Treasurer, setting forth that they pertain to the canal loan, for the sums so borrowed by virtue of this act, or for any part thereof, bearing an interest not exceeding five per cent. per annum, and reimbursable as aforesaid, which stock thus created, shall be transferable on the books of the Auditor General, or at the Bank of Pennsylvania, by the owner or owners of the same, his, her, or their attorney, and new certificates of the same shall be issued by the Auditor General and State Treasurer, to the new holders; and it is hereby further declared, that it shall be deemed to be a good execution of the said power, to borrow for the governor of this commonwealth, to cause the said certificates of stock, or any part thereof, for any amount not less than one thousand dollars as may be judged best adapted for the purpose to be sold; and the faith of the commonwealth is hereby pledged to establish a sufficient revenue for making up any deficiency that may hereafter take place in the funds appropriated for paying the said interest.

Sect. 11. And be it further enacted by the authority aforesaid, That it shall be the duty of the commissioners, of the internal improvement fund, to cause to be paid out of the monies borrowed in pursuance of this act, such sum or sums as shall be necessary for the completion of those divisions of the Pennsylvania canal already located; as well as such other sum or sums as may be necessary for the canals, rail roads, and public works, authorised to be constructed by this act; and also such other sum or sums as may be required for the survey of canal and rail road routes, "and of rivers with a view of slack water navigation," directed by law—and all such sums shall be drawn and accounted for, as is provided by law, provided that the monies necessary for such surveys shall be drawn by warrant of the governor, on the treasurer of the canal commissioners, in favour of the board, instead of the treasurer of the commonwealth. And provided that the fifth section of the act of the 25th Feb. 1826, shall not be construed to prevent the settlement of an account by any acting commissioner or superintendant, for a less sum than $50,000, at any one time.—And provided also, that such acting commissioners and superintendants, may receive from the treasurer of the board, in addition to the original sum of $50,000, a further sum equal to the amount for which such settlements may have been made. "And provided further, that it shall not be lawful to apply any part of the monies appropriated in, or to be borrowed, in pursuance of this act, to the payment in part, or in whole, of any charge or demand made, or to be made, by any person or persons whomsoever, for any real or alleged patent right, for the material commonly called water-lime, or hydraulic cement; or for any real or alleged patent right for any substitute therefor—nor shall it be lawful under any circumstances whatever, to pay on behalf of the State, a price for any such material as aforesaid; or for any work or works containing the same, which shall have been, or may be enhanced, in consequence of any such patent; or of any charge or demand made, or to be made, by reason or in pursuance thereof—and the canal commissioners are hereby authorised and directed, on behalf of the State, to protect all makers, venders, and users, of hydraulic cement or water-lime, which shall be made for, or sold and used in the construction of the Pennsylvania canals and rail roads; and it shall be their duty, and they are hereby authorised, to call upon the attorney general of this State, and also to employ other counsel, if need be, to defend all suits at law which may be brought against the said makers, venders, or users, of hydraulic cement or water lime, on the Pennsylvania canals and rail roads, by any such patentee or patentees, or any other person or persons for their use."

Sect. 12. And be it further enacted by the authority aforesaid, That the money accruing from premiums and loans hereafter to be received into the treasury, as well as the amount already received from that source, shall be paid by the State treasurer to the commissioners of the internal improvement fund; and the same shall be therein vested in aid of the ordinary operations of said fund, provided however no payment of the sums heretofore received into the treasury on account of premiums on loans, shall be made until, in the opinion of the commissioners, the state of the treasury shall warrant it, and the situation of the fund shall require it.

Sect. 13. And be it further enacted by the authority aforesaid, That the amount of money heretofore paid by the commissioners of the internal improvement fund, to engineers and the secretary of the board of canal commissioners under the provisions of the second section of the act, entitled "A further supplement to an act entitled, an act to appoint a board of canal commissioners, passed the 16th day of April, 1827," shall immediately after the passage of this act be paid over by the treasurer of the board of canal commissioners, to the commissioners of the internal improvement fund; and that so much of the second section of the act above recited, as directs the mode of paying the engineers and assistants target men, and secretary of the board of canal commissioners, to be paid by the treasurer of the internal improvement fund be, and the same is hereby repealed.

Sect. 14. And be it further enacted by the authority aforesaid, That the State treasurer be, and he is hereby directed to pay to the commissioners of the internal improvement fund, any sum of money from the balance in the treasury, not otherwise appropriated, which in the opinion of the said commissioners can be done without embarrassing the ordinary operations thereof, in antici-

pation of the loan provided for in this act, to be applied as is directed by the "eleventh" section; and as soon as said loan, or any part thereof, shall have been made, and the money arising therefrom, in sufficient amounts, shall have been received into the said fund, the amount of money, so as aforesaid taken from the treasury, shall be repaid thereto by the commissioners of the said fund.

"Sect. 15. And be it further enacted, by the authority aforesaid, That it shall and may be lawful for the board of canal commissioners so soon as any part of the Pennsylvania canal shall be in a state for navigation, to appoint such and so many collectors of tolls, for the passage of boats and vessels through and along the same, and in such places as they may think proper; and that it shall and may be lawful, to and for such toll collectors and their deputies, to demand and receive of and from the persons having the charge of all boats and vessels, and rafts of timber, boards, planks and scantling, passing through the said canal and locks thereto belonging, such tolls as the said board of canal commissioners may order and direct, and the tolls thus received, shall be paid over by the said collectors quarterly, to the commissioners of the internal improvement fund, and shall be therein vested in aid of the ordinary operations of said fund; and the canal commissioners are hereby authorised to purchase as much ground as shall be by them deemed necessary for the scite of toll houses, and for the accommodation of the toll keepers along the several routes of the Pennsylvania canals and rail roads: Provided, that there shall not be attached to any toll house as aforesaid, a greater quantity than one acre of ground.

"Sect. 16. And be it further enacted, by the authority aforesaid, That so much of any act as requires the contracts made by the canal commissioners to be filed in the treasury office, be, and the same is, hereby, repealed; and all contracts hereafter to be made, shall be filed in the office of the auditor general; and the contracts now filed in the treasury office, shall be transferred to the office of the auditor general.

Sect. 17. And be it further enacted, by the authority aforesaid, That all the provisions of the acts relative to the Pennsylvania canal as are not inconsistent with this act shall be in force, so far as they are applicable to the subject matter of this act.

"Sect. 18. And be it further enacted, by the authority aforesaid, That no canal commissioner or engineer in their employ, or member of either branch of the legislature, shall directly or indirectly, himself or by any other person in trust for him, or for his use, undertake, execute, hold or enjoy, in the whole or in part, any contract hereafter to be made or entered into, for the construction of any of the public works authorised in this act, or for any part of such works; and any person offending against the provisions of this section, shall, upon conviction before any court having competent jurisdiction in the case, be adjudged guilty of a misdemeanor, and shall be fined in a sum not exceeding two hundred dollars, and such contract shall be absolutely void.

EXPENDITURES
OF PHILADELPHIA COUNTY—1827.

[*Compiled from the Accounts lately published.*]

House of Refuge; per act of Assembly		$5,000 00
Loans		22,260 00
Courts—Orphans	183 75	
Common Pleas	2,026 05	
Mayor's	8,648 46	
Supreme	2,268 08	
Oyer and Terminer	1,234 07	
Quarter Sessions	7,932 86	
District	6,950 88	
		29,244 15
Bridges—Frankford	12,528 60	
County	120 53	
		12,649 13
Printing		366 50
Fire-proof buildings		531 97
Fisheries—prevention of illicit fishing		6 75
School fund, 20 per cent. of taxes paid in		25,546 06
County court house and altering, &c.		589 89
Prisons—House of Correction	13,278 71	
Debtor's apartment	1,108 11	
Arch-street	890 20	
Criminal apartment	5,095 17	
		19,872 19
Auditors		750 50
Fuel and candles		252 34
Elections		1,438 54
Public Roads		24,082 37
Assessment		2,793 40
County Treasurer's salary		1,200 00
Agricultural Society		650 00
Commonwealth costs suit		294 17
Interest		301 41
Commissioners Salaries		2,817 00
Clerks do		1,650 00
Solicitor		300 00
Coroner—Inquests, coffins, &c.		2,458 77
Forfeited recognizances		161 35
Ward election expenses		177 75
County lumber yard lot		2.037 07
Incidental expenses		448 51
Sundries		206 05
Painting		252 00
		158,337 87

Balance in the Treasury $6,744 15.

PENAL CODE.

We this week commence the publication of the report of the commissioners on the Penal Code and Penitentiary System; a subject on which the public mind appears to be divided. These commissioners have discussed one side of the question; and those for forming a code adapted to the proposed penitentiary system, have advocated the other; their report will be published after the present one shall have been finished. We regret the length of these public documents, yet we believe the subject is one of great importance to the citizens of this state, and upon which, before either system is adopted, the public should be well informed. It is not probable, from the advanced stage of the session, that either report will be acted upon by the legislature until next winter; sufficient time will, therefore, be allowed to weigh all the arguments on both sides, and to prepare the minds of the members for a decisive vote. After all, we are inclined to believe that experience is the best test of any system, and, as much money has been expended in erecting buildings suitable for making the experiment of solitary confinement, we must confess we should be glad to see that experiment fairly made. Among the warmest advocates for it, are men, who, prompted by benevolent feelings, have reflected much upon the subject, and been for many years actively engaged in the management of institutions, in which they have had opportunities of observing the defects of the present mode of punishment, and whose opinions, therefore, ought to have much weight. Yet we must say, that our own mind is not fully made up upon the subject; there are strong arguments and imposing facts adduced on both sides, and as we said before, we should be glad to have the system of solitary confinement tested by experience; the other sys-

tem has so far failed to produce the desired effect; it is our wish, as we have no doubt it is the universal desire, to adopt that mode of punishment which shall have the best tendency to diminish crime, reform the criminal and be most consistent with humanity.

REPORT
ON PUNISHMENTS & PRISON DISCIPLINE.

To the honourable the Senate and House of Representatives of the Commonwealth of Pennsylvania.

The resolution of the legislature, under the authority of which we received our commissions from the governor, having required of us to submit such suggestions and observations as might be necessary to a proper determination upon the important subject with which we were charged, we now respectfully lay before the legislature an exposition of the principles, upon which we have proceeded, in respect to that branch of our duties, which relates to punishments and prison discipline. We have prepared a more elaborate and detailed report than perhaps the resolutions of the legislature seemed to require, because we are anxious to satisfy the public mind, that sufficient pains have been taken to arrive at correct conclusions on a subject so immediately affecting the primary interests of the commonwealth; and that, although we may have erred in our recommendations, they have not been the result of careless or prejudiced examination. We have felt sensibly the weight of our responsibility, and the arduous character of our duties. A question upon which the attention of many civilized nations is at this moment turned, and which has remarkably divided public opinion among ourselves, was not to be settled, so far as depended upon us, without a careful research into facts and experience, a patient examination and comparison of testimony, and an anxious consideration of theories and arguments. Impressed with this conviction, we have earnestly sought after information from every quarter of our own country, and of Europe; we have personally examined several of the penitentiaries in the United States; and we have consulted all the publications to which we could obtain access. The resolutions directing the appointment of a commission, required our report to be made to the succeeding legislature. Our anxiety to submit as full and matured a report as possible induced us to ask of the last legislature an extension of time; which was promptly granted; and we trust, has not been unprofitably employed. Whatever may be the final decision of the legislature on this interesting subject, we shall have the satisfaction of reflecting that we entered upon the discharge of our duties with a single eye to the public welfare, and have spared neither labour nor expense to perform those duties to the best advantage for the commonwealth.

The just and enlightened spirit of modern times has established a philosophy of punishments, by the rules of which all systems must be erected, and according to whose principles all suggestions must be shaped. It is a cardinal maxim of this philosophy, that punishments must be so inflicted, as to produce the most direct and immediate correction of the offender, with the greatest possible effect upon the mass of society. Whatever goes beyond, or falls short of this object, is an act of oppression to the individual, or of injustice towards the public, and produces corresponding evils in society, which all prudent legislators are desirous to avoid. Keeping in view this fundamental rule, we shall endeavour, by an examination and comparison of the several modes of penal discipline, to arrive at such conclusions respecting their practical operation, as may assist the legislature in determining upon the most judicious and expedient of the several plans suggested to them.

The principal varieties of punishment adopted by governments in ancient or modern times, or suggested by political or philosophical reasons, may be classed under the following heads.

1. Capital punishments.
2. Mutilation.
3. Branding or other marking.
4. Whipping.
5. Banishment or transportation.
6. Simple imprisonment.
7. Imprisonment with labour, but without separation of the prisoners.
8. Solitary confinement, without labour of any kind.
9. Solitary confinement, with labour performed in solitude.
10. Solitary confinement at night, with joint and classified labour during the day.

We are not aware that any modes of punishment have been practised or suggested; which are not embraced under one or other of these divisions. A brief examination of the first six, thus enumerated, will, we conceive, be amply sufficient for our purpose.

1. Upon capital punishments the opinion of this commonwealth has been too long, and two distinctly expressed, to permit us to suppose that a suggestion of applying them to any other, than the single case of wilful and malicious murder, could meet with any favour from the legislature. The enlightened and benevolent founder of Pennsylvania set a memorable example to the nations in the Great law; which rejected the severity of the English system, and carefully limited the punishment of death to the crime for which it is now inflicted. Neither the experience of that generation nor of the present, appears to us to justify any alteration of this humane code. It is well settled that the certainty of punishment operates with at least as decisive effect as the severity of it; and the experience of other nations has proved that the multiplication of capital punishments has never stayed the progress of crime, however it may have thinned for a time the number of offenders. But the mere severity of a penal code is known often to defeat its operation; because those who are charged with administering the laws prefer even a violation of their official duty to the sacrifice of human lives; and thus offenders escape without any punishment, to renew their assaults upon society. Reason and experience therefore, we conceive, unite in recommending an adherence to the present system respecting capital punishments.

2. Mutilation of the person of offenders, the barbarous punishment of a barbarous age, is deservedly repudiated by most civilized nations. Beyond the mere personal suffering of the individual subject, it answers no one purpose of penal infliction. Reformation or correction is little to be hoped for, while the impression on the public mind, produced by the spectacle, is one rather of sympathy with the offender, or of disgust at the punishment, than of horror or aversion from the crime. If the mutilation is carried so far as to deprive the criminal of a portion of his limbs, society suffers, in addition, by the necessary support of him during the remainder of his life. Little need therefore be said in opposition to mutilation, as a mode of punishment.

3. The punishment of *branding*, or other marking of the persons of criminals, has, we believe, never been applied to the higher species of offences, and has generally formed an addition to other punishments, rather than constituted the whole infliction. The observations to which it is liable are similar to those which we have advanced in relation to mutilation. The experience of other states and countries has been found, we believe, decidedly unfavourable to it. To fix a mark of public disgrace upon an individual, which must remain in all its deformity to the close of his miserable life, is perpetually to cut him off from the sources of amendment, and the means of subsistence. Whatever, under other circumstances, might be his wishes for reform, he must move among his fellow beings as a diseased outlaw, a moral leper; alike detested by the public, and detesting the laws of his country. Once enrolled by this badge among the class of criminals, no alternative seems left to him by society, but to pursue the calling, and acquire

fresh marks of an infamous distinction; the moral effect of which, such as it is, decreases in an inverse ratio with the number of inflictions. The inefficacy of this mode of punishment, therefore, is sufficiently obvious.

4. Nor have we reason to think more favourably of *public whipping*, as a punishment for offences. Like that, which we have just mentioned, it is rarely allotted to the higher species of crimes. As a spectacle, it has been found to excite no sensation in the public mind, productive of useful results, and, perhaps, the contrary might with safety be affirmed, from the operation of sympathy, with subjects of a punishment, apparently severe and oppressive to the human frame. Whatever may be the pain or suffering to the offender for the time, it is but temporary: and when the sentence of the law is complied with, it leaves him at liberty to return immediately to his career of crime and to qualify himself for higher and more durable and lengthened punishments. We are not aware that the practice of any community has been found favourable to this species of infliction.

5. *Banishment or transportation* has been used as a mode of punishment from the most ancient times; and of late years has occupied a large share of public attention, and considerably divided public opinion; at least in other countries. The importance of the question under some circumstances may serve as our excuse for treating it more in detail than those to which we have had occasion to advert.

This species of punishment is of three kinds.

1. Simple Exile.

2. Deportation; by which we would designate the compulsory removal of offenders to some foreign shore, where they should be left without further care on the part of the government.

3. Transportation, or the compulsory removal of offenders to a distant place, where they are subjected to the penal government and discipline of the mother country.

We use those terms for the sake of convenience and distinction, and not perhaps, according to their exact signification.

1. We understand by *simple exile*, the mere banishment of the offender from the soil of the state or country whose laws he has violated; under some stipulation, or the denunciation of some severe penal infliction in the event of his return.

In the practice of modern times, this punishment has generally been allotted to political offences, of a grave character. The moral right of a government to turn loose its convicts upon other nations, may, we think, well be questioned. The right of every other government to refuse them admission is unquestionable; and this would doubtless be exercised, were the practice of banishment for moral crime to become at all frequent. In effect, therefore, a sentence of simple exile would for the most part be inoperative. If practicable, however, we respectfully submit, that it would be unavailing as a measure of conviction. A large proportion of offenders are transitory and cosmopolitical in their characters.—They have few, if any, of those attachments, which bind the virtuous part of the community to the country of their birth or choice, and which render exile to them a suffering only short of death. Simple banishment, therefore, where practicable, only removes the offender to another and perhaps, equally congenial scene of action; and upon the community at large produces no visible effect.

We cannot help in this place, calling the attention of the legislature, to a practice, which appears to prevail in some of the states of this Union, and which must in its operation prove extremely prejudicial to the interests of this commonwealth, as well as of others. We allude to the banishment of offenders from the particular state, leaving them at liberty to commit depredations and outrages in every other state. A just sense of the rights and dignity of this state, seems to require that measures should be taken by remonstrance or otherwise to put an end to this practice for the future. And if these should prove unavailing, a system of counter action appears to us to be equally requisite. It is manifestly unjust for any state to throw the burden of its convicts upon another state. The forced introduction of criminals into parts of this country, during their colonial condition, was one of the grievances, of which our ancestors loudly complained, and which led, in a measure, to the declaration of independence. The state which pardons its convicts on condition of their leaving its territory, enjoys an exemption from evil, at the expense of its fellow communities, which no constitutional or social relation obliges them to acquiesce in. No state has a right to require a sister state to become the penitentiary of its convicts. The right of self defence fully authorises the state in which such convicts may arrive, to remove them by compulsion, and return them to the state from which they were let loose. We conceive, therefore, that should it be found by experience, that criminals from other states arrive in Pennsylvania, under circumstances such as we have stated the legislature would owe it in duty to the people of this commonwealth, to adopt such measures as would most effectually put an end to the practice.

2. We have applied the term, *deportation*, to that species of punishment which consists in the removal of offenders to some distant place, and the deposit of them at such place, without further care on the part of the government, whose laws they have infringed. It differs from simple exile in this, that the removal is the act of the government, by whom the place of deposit is selected for the purpose. We should have little to remark upon this method of punishment, were it not, that it has recently been pressed upon the consideration of the legislature, and the public, by some of our active and well intentioned citizens. It has been suggested that the objects and ends of punishments might be attained in an effectual manner, were the government of the United States to take possession of some uninhabited island; such as the island of Tristan da Cunha, in the Atlantic ocean. The respective state governments might then, at stated periods, remove their convicts to this great depot of crime; and after supplying them with sufficient food and clothing for a time, and with tools of trade and implements of husbandry for future support, might with propriety and convenience, it is said, leave them to their own exertions. Necessity, it is argued, would soon produce order, and some kind of government among them; and the community, whom they had injured, would be effectually relieved from their presence, at a very limited expense. This scheme it may be remarked, has never, according to the best of our information, been put in practice in any country; and depends for success entirely on the reasonableness of its theory. It is liable, we think, to many serious objections; among which we may enumerate the following. In the first place, it confounds all crimes, by imposing upon all, the same extent of punishment. As the banishment is to be without limit of time, it must be for life; and thus either the minor class of offences must be excluded, or receive an equal weight of punishment with those of the most aggravated character. Again the plan presupposes the existence of a suitable place of deposit, and the power to acquire such place; neither of which is very obvious to our apprehension. Another, and perhaps the most serious objection, arises from the proposed abandonment of the convicts as soon as landed. It must be presumed, that all the convicts to be removed are able bodied persons, capable of acquiring the means of support—which of course implies that all others are to remain; and be the subjects of some other kind of punishment. If we believe that order will prevail among those removed, and that contrary to all probability, rapine and bloodshed will not ensue among themselves; it cannot be doubted that this band of criminals will obtain the means of escape, or resolve themselves into a nation of pirates.—Accident, ship wreck or other causes, must occasionally throw vessels, or the materials of vessels, on their shore;

and the history of navigation teaches us how readily men, in similar circumstances, obtain the means of escape, and return to their own country. We must therefore conclude that this system of punishment would be found, in practice, attended with unavoidable and insurmountable difficulties.

3. The punishment of *transportation*, as adopted of late years in Great Britain, consists in the removal of offenders for life, or for a term of years, to a distant place, under the jurisdiction of the government, whose laws they have violated, and subjects them to penal discipline in such place, which becomes, in effect, only an enlarged penitentiary. Of the efficacy of this system of punishment in producing the desired results of penal law, we believe the experience of Great Britain does not authorise us to speak favourably. For the time being, doubtless, transported convicts are placed beyond the reach of repeating evil in the mother country. The insular position and remoteness of New Holland, and the rigorous system of government pursued there, have rendered escape and return to Great Britain difficult, if not altogether impossible. So far, too, as the convicts have, after the expiration of their sentence, applied themselves to the cultivation of the soil, or other kinds of industry, their establishment in a new country may be considered as a beneficial exchange. We believe, however, that the corrupt habits and infirm constitutions of most of the convict settlers of New Holland, have rendered the number of useful labourers very small. But whatever advantages may attend the system of colonial transportation, they are attended with drawbacks and evils which probably counterbalance them. In the first place, the necessary expense of this system must in any event be of great magnitude. The removal of the offender to a distant place; his necessary support there for a time at least; the maintenance of the colonial government, all imply great charges, which must be defrayed by the mother country; and the experience of the British nation has been in accordance with this belief.

It appears from the returns made to the British parliament, that from the year 1787, when the settlement of New Holland commenced, to 1820, the number of convicts transported amounted to 25,878. The cost of transporting is estimated at £100* sterling each: And the annual expense is not less, probably, than £40† sterling; equivalent to $177 60 of our money for each convict. From the returns laid before parliament, it appears, that the expenditure of the British government for the transportation to, and support of convicts at New Holland from 1786 to 1817 inclusive, was about four million pounds sterling, or upwards of seventeen and a half millions of dollars. In 1820 the annual expense of the colony is stated at £300,000‡ sterling, or $1,332,000. It is estimated by British writers that *one-tenth* of the sum expended on this colony would have subsisted at home the whole number of convicts, while something might have been gained from their labour to the public treasury, which was not obtained at New Holland. On the score of expense, therefore, the system of transportation is objectionable. Again, experience shows that reformation of the offender is not to be looked for in a community of convicts. From the returns to the British parliament before mentioned, it appears that out of 4376 convicts, whose sentences had been remitted, or whose time had expired, only 369 were considered respectable in conduct and character. In fact, the same causes which have operated to render our own penitentiaries the seats of crime and the schools of iniquity, namely, free intercourse with the contagion of vice, have operated on a larger scale, and with more powerful effect in New Holland. Other objections exist to transportation as practised by the British, of which one only need be mentioned. In point of effect, all distinction of crime is confounded, by the difficulties in the way of the criminal's return on the expiration of his sentence, whatever difference exists nominally in the number of years to which the sentence extends. The government does not undertake to return the prisoner; his means seldom permit of his return at his own expense, if the opportunity of a private conveyance occurred; and thus a punishment of exile is superadded, not less unjust in principle, than impolitic, in destroying the classification of crimes.

Such are the views we have taken of the punishments of banishment or transportation.

6. Simple imprisonment of criminals, or the mere restraint of their persons, by day and night, without labor or separate confinement, is so obviously defective as a mode of punishment for convicts, that little is requisite to be observed on this head. Neither personal suffering nor amendment of the individual, nor any degree of influence upon society is to be looked for in this case; and the expense of maintenance is borne by the honest portion of the community, exclusively. The experience of the evils of this system has accordingly produced an abandonment of it in almost every part of Europe, in which public attention has been turned to the subject of penal discipline. In our own commonwealth it has been repudiated from the earliest times. The tenth section of the laws agreed upon in England, in May 1682, declared that "all prisons shall be *work-houses* for *felons*, vagrants and loose and idle persons; whereof one shall be in every county." The same provision was repeated in the *great law;* and acts of Assembly were subsequently passed to carry this wise ordinance into effect. Labour has at all periods of our history been inflicted as the just punishment, and meet retribution of convicts. The extent to which it shall be exacted, and the circumstances under which it shall be performed, are questions upon which a diversity of opinion has prevailed in the public mind, both here and in Europe. Under the remaining divisions of the subject, we shall offer to the legislature the result of the best examination we have been able to give to these embarrassing questions.

7. Imprisonment with hard labour, but without classification or separation by day or night, was the earliest in the series of what are now denominated penitentiary punishments. It has been already mentioned, that the strong and far-sighted intellect of the founder of Pennsylvania, perceived the expediency of employing labour as a means of punishment and a compensation to society, half a century before the legislators of Europe began to turn their thoughts to the subject. The earliest provisions of our laws directed the employment of convicts "at hard labor in the house of correction," for a term of years, corresponding with the enormity of the offence. Of the manner in which the punishment was inflicted, or its effect in practice, we have no means left of judging. The alteration of the criminal code which took place in 1717, in consequence of the pertinacious attachment of the British government to capital punishments, seems in practice, to have restored the dominion of idleness in the interior of our prisons; for although to some minor offences, the punishment of confinement for a short period at hard labour was annexed, yet the concurrent testimony of all, who remember its condition, represents the provincial prison of Philadelphia as a scene of profligacy and license, in which all sexes, ages and colours were confounded without classification, without labour, and without restraint. During the revolutionary contest, it is not to be wondered, that the attention of the legislature was diverted from the spectacle, or that it was deficient in the means of reformation. The constitution of 1776, however, had directed a reform of the penal laws, and the introduction of hard labour as the punishment for offences. One of the earliest measures after the consolidation of independence, was the reformation of the penal code, and the substitution in many cases, of the penitentiary discipline for the punishment of death.

* Edinburg Review, vol. 13, p. 181. Quarterly Review, vol. 12, p. 42.

† Quarterly Review, vol. 12, page 42.

‡ Quarterly Review, vol. 24, p. 247.

The act of 1786 provided, that certain crimes, which had before been capital, should, for the future, be punished with hard labour, "publicly and disgracefully imposed." The convicts were, accordingly, employed in cleaning the streets, repairing the roads, &c. Their heads were shaved, and they were otherwise distinguished by an uniform and peculiar dress. What were the results of this system of punishment, will be best told, in the words of a distinguished philanthropist, who was himself an eye witness of its operation. The directions of the law of 1786 were "literally complied with, but, however well meant, were soon found to be productive of the greatest evils, and had a very opposite effect from what was contemplated by the framers of the law. The disorders in society, the robberies, burglaries, breaches of prison, alarms in town and country—the drunkenness, profanity and indecencies of the prisoners in the streets, must be in the memory of most. With these disorders the number of the criminals increased to such a degree, as to alarm the community with fears, that it would be impossible to find a place, either large or strong enough to hold them. The severity of the law, and disgraceful manner of executing it, led to a proportionate degree of depravity and insensibility, and every spark of morality appeared to be destroyed. The keepers were armed with swords, blunderbusses, and other weapons of destruction. The prisoners, secured by cumberous iron collars and chains fixed to bomb-shells. Their dress was formed with every mark of disgrace. The old and hardened offender daily in the practice of begging and insulting the inhabitants—collecting crowds of idle boys, and holding with them the most indecent and improper conversation. Thus disgracefully treated, and heated with liquor, they meditated and executed plans of escape—and, when at liberty, their distress, disgrace and fears, prompted them to violent acts to satisfy the immediate demands of nature. Their attacks upon society were well known to be desperate and to some they proved fatal."*

The discipline of the prison was not less remarkably deficient in wisdom and humanity. It will hardly be credited, that so recently as the year 1788, the prison of Philadelphia presented the spectacle, of the confinement of debtors with criminals, of honest poverty with the most vile and revolting of crimes, and the indiscriminate intercourse both by day and night, of women and men, whether debtors or convicts. Nor was this all, spirituous liquors were sold at a bar, inside of the wall, to all its inmates, and produced, as might be expected, scenes of profligacy and impurity disgraceful to the city of Penn. It is the peculiar blessing of free institutions that no abuse can long survive the broad light of public examination. The legislature were no sooner made sensible of the evils of the prevailing system, than they attempted its reform with vigour and earnestness. The acts of 1789, 1790, 1791, 1794 and 1795, prove the anxiety that existed to correct mistakes, and establish a system of punishments, which should combine severity and certainty with humanity; and by removing public disgrace, and the temptations to excess, leave room for the possible entrance of reformation. The system of penitentiary discipline, now pursued in the prison at Philadelphia, and subsequently imitated at New York, Boston, Baltimore and other places, was prescribed by the acts we have enumerated; and consists of that species of punishment which we have ranked as the seventh in the order enumerated. From the establishment of the penitentiary system in full effect in the year 1794, to the present time, its progress and results have been watched with intense anxiety, by a large portion of the public. A problem of immense importance to the condition of mankind was to be solved, and the natural interest in its solution, kept public attention earnestly fixed upon the subject. Fortunately, too, the means of obtaining insight into the working of the machinery, and of procuring all necessary information upon statistical facts, have been accessible to all; and, under these circumstances, it would seem easy to arrive at just conclusions upon this important subject. Very opposite results however, are furnished by the early and recent history of the penitentiary at Philadelphia. Shortly after the first experiments in reformation were made, but before full effect had been given to the system, a striking improvement was observed in the criminal calendars. The number of convictions for offences, previously capital, was considerably less than in previous years, although population and wealth had rapidly increased. On the 3d of May 1791, the number of convicts in the jail of Philadelphia was 143, while on the 3d of Decem. 1792, the number was only 37*. It will be seen from the tables, which are subjoined to this report and which we have taken pains to compile from the best sources of information, that the number of convictions for all offences was, in

1787	108	1793	45
1788	98	1794	92
1789	131	1795	116
1790	112	1796	145
1791	78		
1792	65	In 10 years,	990

Thus, apparently, proving that the introduction of penitentiary punishments did not produce any augmentation of crime. During the 10 years fron 1797 to 1807 the number of convictions, for the same offences, 1311; an increase perhaps not greater than might have been expected from the great augmentation of the population. From 1807 to 1817, however, the number of convictions rose to 2612; a frightful increase; to almost double those of the preceding term. During the last 10 years from 1817 to 1827, the convictions have amounted to 3151, an increase almost equally alarming.

The condition of the prison of Philadelphia, during the first 10 or 15 years after the change of system, became the subject of universal remark. Foreigners, as well as our own citizens, were struck with the degree of order and decorum that prevailed, with the exact discipline pursued, and the great apparent amendment of the demeanour and habits of the convicts.

We quote from a memorial of the inspectors to the legislature, dated January 8th, 1821, the following testimony to the character of the prison, in its early stages, and at a period when solitary confinement was not spoken of, except to enforce the prison discipline.

"The prison was well managed. Industry was encouraged among the prisoners. Employment was abundant, and in consequence of the number of the criminals being small, classification to a certain degree was observed. The consequence was, that the internal part of the building appeared to a visitor, rather like a well regulated manufactory, than a prison. Instances of reformation in the early period of this system occurred, and among all the prisoners, order and good discipline were maintained."† The successful result of the experiment in this state, led, as is well known, to the adoption of the penitentiary system in almost every other state in the Union, and has been quoted as authority and evidence for reformation in Europe. Within the last twenty years, however, a remarkable and melancholy change has taken place, which so completely reverses the picture, that a stranger might well doubt whether it were drawn for the same institution and the same community. In 1803 it appears from a petition to the legis-

* An account of the alteration and present state of the penal laws of Pennsylvania, &c. by Caleb Lownes.

*This fact is taken from an official statement published in the appendix to the very instructive essay on the punishment of death, by the late William Bradford, esq. The difference may possibly have been caused in part by the recent occurrence of a criminal court.

† Senate Journal 1820—1, page 335.

lature by "the society for alleviating the miseries of public prisons," that the prison was then "no longer capable of containing the prisoners in such a way as to answer the intention of the legislature." In 1816 the same valuable association published "a statistical view of the operation of the penal code of Pennsylvania," in which it is stated, that "the institution already begins to assume, especially as respects untried prisoners, the character of an European prison, and a seminary for every vice, in which the unfortunate being, who commits a first offence, and knows none of the arts of methodized villainy, can scarcely avoid the contamination, which leads to extreme depravity; and with which from the insufficiency of the room to form separate accommodations, he must be associated in his confinement." The same judgment was pronounced, in almost the same terms, by a committee of the legislature of Massachusetts, who in the year 1818 visited this state, for the purpose of examining into the operation of the penitentiary system.

In 1821, the then board of inspectors addressed a letter to a committee of the senate, in which the condition of the prison was forcibly delineated, and some of the causes of the unhappy change were clearly and justly indicated. We make the following extract, because it must be considered as an authentic exposition.

"It seems to be generally admitted, that the mode at present in use in the penitentiary, does not reform offenders. It was intended to be a school of reform; but it is now a school of vice. It cannot be otherwise, where so many depraved beings are crowded together, without the means of classification or of adequate employment. There were in confinement on the first instant. (January) 424 men and 40 women convicts. For want of room to separate them the young associated with the old offenders; the petty thief becomes the pupil of the highway robber; the beardless boy listens with delight to the well told tale of daring exploits, and hair breadth escapes of hoary headed villainy; and from the experience of age derives instructions, which fit him to be a pest and terror to society. A community of interest and design is excited among them, and instead of reformation ruin is the general result."*

Many other testimonies might be cited, if necessary, to prove that the condition of the prison of Philadelphia, within the last ten or fifteen years, has been the standing reproach and contradiction of the friends of the penitentiary system, and furnishes a melancholy contrast to the evidences and promises furnished by its early operation. Such being the existing state of things, it becomes important for a first determination upon the subject, to ascertain whether the recent evils have sprung out of the system itself, or are the result of an imperfect or vicious mode of administering it. For which purpose, it is necessary to take a brief review of the different acts of assembly, by which the penitentiary system was established, that it may be seen whether they have been duly observed in practice, and if not, what circumstances have occurred to prevent their proper observance.

The act of April 5th, 1790, (2 Smith's Laws, 531,) which repealed all the former laws upon the subject, and completed the essay of the penitentiary system, after providing the punishment of hard labour for certain offences, directed, in the 8th section, that the commissioners of Philadelphia county should cause a suitable number of cells to be constructed, *six* feet wide, *eight* feet long, and *nine* feet high, "for the purpose of confining therein the more hardened and atrocious offenders," who may have been sentenced to hard labour for a term of years. Separation between convicts, vagrants, and persons charged with misdemeanors, was directed to be enforced "as much as the convenience of the building would admit." The convicts were to be clothed in habits of coarse materials, uniform in colour and make; the males were to have their heads and beards shaved close, at least one in each week; they were to be sustained on the coarsest food, and kept to labour of the hardest and most servile kind, during which they were to be "kept separate and apart from each other, if the nature of their several employments will admit thereof;" and "where the nature of the employment requires two or more to work together, the keeper of the goal or one of his deputies shall, if possible, be constantly present." A subsequent section enacted, that if proper employment could be found, the prisoners might also be permitted to work *in the yard;* provided it were done in the presence, or within view of the keeper or his deputies. The number of hours of work was also prescribed, viz: *Eight* in November, December and January; *nine* in February and October, and *ten* in every other month.

An act, passed on the 22d of April, 1794, (3 Smith's Laws, 186,) provided, (sect. xi.) that persons convicted of crimes, which by former laws were punishable with death, (except murder in the first degree,) should be kept in the solitary cells, on low diet, for such portion of the term of imprisonment, (not more than one half, nor less than one twelfth part thereof,) as the court in their sentence should direct and appoint. The act of 18th April, 1795, (3 Smith's Laws, 246,) enacted, that the inspectors of the prison should have full power to class the different prisoners, in such manner as they should judge would best promote the object of their confinement.—The provisions of the act of 1790, which directed that the clothing of the convict should be of the coarsest materials and their labour of the hardest and most severe kind, were repealed; as was also a clause of the same act, which allowed the keeper of the prison a commission of five per cent. on the sale of articles manufactured by the convicts.

These are the chief provisions of the acts relating to penitentiary punishments. It will be seen, upon examination, that they contemplated a system of classification, at least as between the tried and untried, of severe and unremitting labour during the hours at which labour is practicable by day-light; and of separation of the offenders, during the period of labour, where the nature of the employment permitted of it. No provision was made, however, for any general system of solitary confinement, nor even for the solitary confinement of any class of criminals, during the period of imprisonment:—All that appears to have been contemplated was solitary confinement, for a greater or less term, according to the sentence of the court, and the subsequent return of the offender to the society and intercourse of the convicts. Certainly, no provision was made for separate dormitories, or separation during meals. The size of the cells, which the act of 1790 required to be constructed, seems to negative the idea of their being intended for the separate confinement of individuals. The cells in the Auburn prison are only *seven* feet high, and *three* and a half feet wide, and are sufficiently capacious for the intended purpose, The area of the cells at Philadeiphia, according to the directions of the act, was to be more than twice this size, or as 48 to 21. It was evident that the limits of the prison would not have admitted of the construction of cells of this size for more than a small number of prisoners. And it soon became evident, that the cells constructed by the commissioners were not sufficiently numerous even for "the more hardened and atrocious offenders." Consequently, the intercourse between the convicts, both by day and night, became constant and corrupting.

The alterations in the system, produced by the act of 1795, were perhaps more important, than they appeared at first sight. The repeal of the clause in the act of 1790, which directed the convicts to be clothed uniformly in coarse habits, the heads of the males to be shaved, and that they should be subjected to the hardest and most servile labour, may have produced a prejudicial effect on the discipline of the prison, or the penitential operation of the punishment. We are, at all events, un-

* Senate Journal 1820-1, page 334.

acquainted with the causes which induced the repeal; and inclined to believe, that, especially that part of the old laws which required the labour of the convicts to be of a severe and servile character, was sound in theory, and serviceable in practice; and that, one of the great faults of the existing system, so far as we have had an opportunity of personal examination, is the lightness of the labour, both in respect to its character, and the extent of time devoted to it. The provision, which gave to the keeper of the goal five per cent. commission on the sale of manufactured articles, may also have excited on his part an interest in the labour of the convicts, which tended to produce more constant application, and left less time for idleness and corrupting communication.—The repeal of this clause, therefore, may have been prejudicial to the interests of the institution. The same act repealed a clause of the act of 1790, which authorised the infliction of moderate whipping, not exceeding thirteen lashes each time. We are ignorant, however, whether the punishment of whipping was frequently administered, or otherwise, under the former act.

Whatever may have been the operation of these alterations in the law, it is certain that a considerable increase of conviction took place about this period.—The number of convictions which in 1792 was 65, and in 1793 was 45, amounted in 1794 to 92, in 1795 to 116, and 1796 to 145.

The testimony of all who had opportunities to examine the progress and present state of the Philadelphia prison, united with our own observation, convinces us that the flagrant evils of that establishment, are referrible to the communication, which takes place between the convicts by day and night, during their work, at their meals, and in the perilous interval between the conclusion of their labour in the evening, and the resumption of it the next morning. Other causes have also operated to produce the same result. Among the principal of which is the frequency of pardons, and the system upon which they have of late years been recommended and obtained. The enormous increase in the number of convicts, and the insufficiency of the prison accommodations have, we understand, reduced the Inspectors to the necessity of applying, annually, for the pardon of a number of the convicts, to make room for others; and by this means it has happened, that the average term of imprisonment actually passed, has been far below the amount inflicted by the sentence of the courts. The operation of a state of things like this, could not be otherwise than mischievous. The frequent changes in the persons of the inhabitants, the occasional enlargement of the most vicious, the abbreviation of the term of punishment of all, would probably, if the discipline of the prison were in other respects perfect, lead to the results we have mentioned; and which have caused the prison of Philadelphia to forfeit the high character it once possessed, and to become a reproach to the city in which it is located, and to the state by whom it ought to be superintended.

The prevailing evils of the prison may, therefore, be considered partly as the necessary consequences, and partly as abuses of the system established by the acts of 1790, 1794 and 1795. The same is true, we have reason to believe, of most, if not all, the prisons in England and this country, established about the same period. Differing as men do in some respects, as to the causes of these evils, all agree that a change or reformation of practice is imperiously required by every motive of policy and humanity. In what manner the system shall be reformed, however, is a question upon which, as we have already intimated, there exists a great diversity of sentiment: The different suggestions that have been made with this view will be considered under the remaining divisions of punishments.

[*To be continued.*]

A Shad was taken on the 17th of March, opposite C. Musser's farm, 4 miles below Harrisburg, York county.

On Saturday last, March 22, there was a fall of Snow on the Broad Mountain, about ten miles from this place, four inches in depth. There was no snow here, whatever, at that time.—*Miner's Journal, Pottsville.*

On the 7th inst. we had the pleasure of seeing a Martin, we believe the first of those agreeable accompaniments of the spring season which has made its appearance. Perched alone upon a lofty tree, the note of the little stranger attracted much attention from having made its appearance so early in the season.—*Ibid.*

Union Canal.—The water is in this canal, and we were yesterday informed by a merchant of this place, that a boat had arrived at Middletown from Philadelphia.

Pennsylvania Canal.—The water was, on Tuesday last, let into this canal at M'Allister's mill; and a gentleman has just stepped into our office with the information, that it has reached and is filling the basin near this place.—*Harrisburg, March 20.*

Extract from a Middletown paper.

ARRIVED.

The Canal Boat Dauphin, captain Thomas, from Philadelphia, belonging to Eldridge & Brick, with a cargo of

487 Spanish Hides	to the Dauphin Tannery
10 tons Gypsum, }	Carlisle & Humphreys,
100 Hides, to }	of Middletown
1 bbl. Merchandise	Peter Miller, of Dauphin
5000 Shell Fish	Captain.

Middletown, Monday evening, March 24, 1828.

This boat sailed from Fair Mount Dam in company with several of the company boats, and parted with them on the evening of that day, and heard nothing of them since, excepting that there was a report of their having got on as far as Reading. This boat we consider to be the first from Philadelphia, with an assorted cargo, there was, however, an arrival of a small boat with oysters, &c. some days sooner.

In opposition to the opinion expressed in the article on the *Delaware Trade and Canal*, in our last number, "that an uninterrupted canal communication cannot be had on any of the routes from Tioga Point to Philadelphia, Baltimore or New York," a person well acquainted with that section of country, says that

"A complete canal communication can be had with Tioga Point from Philadelphia by the Lehigh route, and with the same distances as mentioned in that article; but if rail roads are adopted in part, the distance from Mauch Chunk to Berwick would be reduced to 32 miles, which would make the whole distance to Tioga Point by that route 287 2-3 miles. But on the plan of rail roads, the Lehigh route would go by Wilkesbarre instead of Berwick (both which points can be reached in the same distance from Mauch Chunk) in which case the distance from Wilkesbarre to Berwick must be deducted, which would reduce the whole distance from Philadelphia to Tioga Point to about 265 miles; and from New York by the Delaware and Raritan Canal, (which will no doubt be completed,) Lehigh and Wilkesbarre, to Tioga Point, about 290 miles, both having the same lockage, which is believed to be less to both cities than by any other route.

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